Amendments to the Specifications:

Please delete the first paragraph on page 1 and replace it with the following rewritten paragraph:

This patent application is a continuation-in-part the now abandoned United States Patent Application 10/022,858 filed December 20, 2001 entitled De-Orbit Instrument Package which is incorporated herein by reference which relates to United States Provisional Patent Application Serial No. 60/256,475 filed on December 20, 2000 entitled De-orbit Instrument Package both of which are incorporated herein by reference.

Please delete the second paragraph on page 2 and replace it with the following rewritten paragraph:

On the other hand, the microsat instrument packages are normally designed for long lifetimes (2-3 years), which require electronics capable of surviving the high radiation environment of space. Rad hardened (electronic details modified to increase survivability in radiation environment) components are particularly expensive, compared to equivalent terrestrial ones. In addition to being expensive, the selection of components which are qualified for high radiation environments are restricted, because only a subset of available terrestrial technologies become qualified for high space radiation environment.

Due to apparent scanning errors, please delete the first paragraph after the title DETAILED DESCRIPTION OF THE INVENTION on page 6 and replace it with the following paragraph resubmitted herewith:

The instrument package in accordance with the present invention employs payload design load factors which are much lower than can typically be realized with

conventional means, because the shock and vibration levels it is exposed to are lower. This reduces the weight, and thus the cost of obtaining data. The principle of the instrument package is that it is given kinetic energy in addition to excess potential energy by a larger and more reliable launch vehicle than the existing sounding rocket. The instrument package can then utilize the excess energy in extending the duration of the flight and in manoeuvring across the area of atmosphere above the earth. The kinetic energy (orbital velocity) allows for longer duration viewing of conditions at a particular altitude than would be possible with a sounding rocket. The excess energy allows lateral motion of the instrument package, resulting from the aerodynamic forces being generated.

Please delete the first full paragraph on page 8 and replace it with the following rewritten paragraph:

The instrument package can be stored on a space station above the planet, for release and operation at any convenient time with respect to desired observations. The instrument package 20 may be 'launched' from the International Space Station (ISS) via Special Purpose Dexterous Manipulator (SPDM) micro interface 12 for on-orbit robotic manipulation release. Alternatively, the instrument package 20 may be launched via release from a kick-off springs 11. Prior to release the instrument package 20 may be held in place with a tie-down mechanism 10 on Space Station. Tie-down mechanism 10 includes in part a tie-down bolt 119 and a tie down nut 120 which is robotically activated. Tie-down mechanism includes a hard dock interface 121 which includes a tie-down shoulder 123 formed in the tie-down mechanism and a corresponding package shoulder 124. The package shoulder 124 seats in the tie-down shoulder 123 when the tie-down bolt has been fully torqued. Instrument package also includes a soft dock mechanism 117, a soft dock indicator 118 and a robotic handling target 116. Instrument package 20 is also provided with electrical connectors 122 for keep-alive power and data checkout while on Space Station. The spring launch mechanism 11 may form part of tie-down mechanism 10.

The instrument package 20 does not include the spring launch mechanism 11 which is external to the housing 22 and protective cover 15 and which is left behind on Space Station after launch.

Please delete the first full paragraph on page 9 and replace it with the following rewritten paragraph:

Once the instrument package 20 is released from Space Station it will begin its decaying orbit to earth. At a selected altitude (based on the particular on board instrument requirements) the instrument package 20 will deploy any additional aerodynamic surfaces, such as a parachute, needed to modify the descent orbit and then begin obtaining data by using cameras and/or other types of scientific instruments. Fig. 1 shows a volume for stowed parachute at 14.

Please delete the second paragraph on page 11 and replace it with the following rewritten paragraph:

One method of launching the deorbiting instrument package from the International Space Station or the shuttle or any other space orbiting platform is described generally in the flow chart in figure 8. Firstly the instrument package is released from the space orbiting platform. Once the instrument package is far enough away from the space orbiting platform so as not to cause any problems a chute is deployed. Thereafter the instrument package orbits the earth and the scientific instruments therein collect the data and transmit it to the communication receiver. The data may be transmitted to a receiver on the International Space Station or to a receiver on the earth. It may be necessary to bounce the transmission off a satellite in order before it reaches the desired receiver. Preferably the instrument package is destroyed above a predetermined distance from the earth to reduce the risk of any debris. One advantage of the instrument package herein is that both the package instruments and the scientific instruments can be checked prior to launch from the space platform.

Where one or more of the instruments is non responsive the instrument package may be opened and where possible the instrument may be repaired. On the other hand if the instrument cannot be fixed that instrument package will not be launched and the cost of the launch will be saved.

Due to apparent scanning errors, please delete the first paragraph on page 13 and replace it with the following paragraph resubmitted herewith:

The initial orbit of the instrument package 20 will be similar to that of the Space Station or the Shuttle itself (which takes place over a significant portion of the populated planet of earth). It can be modified by a combination of initial launch characteristics and the aerodynamics of earth's atmosphere at altitudes below (by use of parachutes or other aerodynamic surfaces) in addition to small amount of control ability provided by any on board thrusters. A graph of the showing de-orbit lifetime versus ejection speed of a simulation of a de-orbit of the de-orbit instrument package from an international space station is shown in figure 6. The graph shows the lifetime after ejection as a function of retrograde ejection speed relative to Space Station. Typical release point from typical Space Station orbit (station location at release, 4126.2, 2725.8, 4596.5 km, velocity -5.905, 3.926, 2.959 km/s in Earth-Centered-Inertial system). US Standard Atmosphere. Assuming an instrument package weight of 20 kg the lifetime is shown at 125 for C_DA=0.5 m^2 and at 126 for C_DA=5 m^2.

Due to apparent scanning errors, please delete the last paragraph on page 14 that continues onto the first line of page 15 and replace it with the following paragraph resubmitted herewith:

In contrast conventional satellites and microsat components must be designed to sustain very high vibration levels due to the separation conditions from their rocket. These high vibration forces (as from explosive bolt separation 'kicks') are often very localized, but until the space craft design is complete, it is often unclear if a

component will experience that high level, so it must be designed to withstand it.

Due to apparent scanning errors, please delete the last paragraph on page 15 that continues onto the top of page 16 and replace it with the following paragraph resubmitted herewith:

Further the instrument package 20 of the present invention includes a number of advantages. For example, the release of the package from a manned orbiting space station allows for check-out and repair of the package from any damage that may have occurred during launch from terrestrial environment, or under storage conditions prior to release from the space station. The potential storage of the package on a manned space station allows for check-out of the package to ensure its major systems have remained functional. There is the potential to repair these systems if they are damaged. The potential storage of the package inside a manned space station, coupled with its relatively short operational life, suggests that the electronics devices will not have to be rad hardened. This results in lower cost, and in the ability to utilize the most state of the art components. Further the potential storage of the package inside a manned space station allows the users to respond quickly to say unusual weather pattern occurrences such as an earth quake or volcano eruption and to begin collecting data very quickly.

Due to apparent scanning errors, please delete the third paragraph on page 16 and replace it with the following paragraph resubmitted herewith:

As used herein, the terms "comprises" and "comprising" are to be construed as being inclusive and opened rather than exclusive. Specifically, when used in this specification including the claims, the terms "comprises" and "comprising" and variations thereof mean that the specified features, steps or components are included. The terms are not to be interpreted to exclude the presence of other features, steps or components.

This listing of claims will replace all prior versions, listings, of claims in the application:

Listing of Claims:

1. (original) A space launched de-orbit instrument package for carrying on board observation instruments comprising:

a housing including a protective skin and adapted to be launched from space into a de-orbit pattern, the housing having one side and an opposing side and a tie down mechanism extending from the one side to the opposing side;

a power supply secured in the inside of the housing;

a communication system operably connected to the power supply for transmitting data to a location remote from the instrument package; and

an internal instrument volume inside the housing adapted to receive at least one scientific instrument which is connectable to the communication system.

2. (original) A space launched de-orbit instrument package as claimed in claim 1 further including an on board control system operably connected to the power supply.

3. (original) A space launched de-orbit instrument package as claimed in claim 2 further including an attitude control system operably connected to the on board control system.

4. (original) A space launched de-orbit instrument package as claimed in claim 3 further including a global positioning system connected to the communication system.

5. (original) A space launched de-orbit instrument package as claimed in claim 4 wherein the on board control system is a computer.

6. (original) A space launched de-orbit instrument package as claimed in claim 5

further including solar arrays mounted on the outside of the housing.

7. (original) A space launched de-orbit instrument package as claimed in claim 5 further including a parachute mounted in the housing and deployable outside the housing.

8. (original) A space launched de-orbit instrument package as claimed in claim 5 further including a launch mechanism attachable to the outside of the housing and wherein the launch mechanism forms part of the tie down mechanism.

9. (original) A space launched de-orbit instrument package as claimed in claim 5 wherein the payload of the instrument package is less than 40 kg.

10. (original) A space launched de-orbit instrument package as claimed in claim 5 wherein the housing has a viewing window formed therein and the internal instrument volume is proximate thereto whereby the instrument positioned in the instrument volume looks out the window.

11. (original) A space launched de-orbit instrument package as claimed in claim 1 wherein the instrument package is adapted to be launched from the International Space Station.

12. (original) A space launched de-orbit instrument package as claimed in claim 1 wherein the instrument package is adapted to be launched from the space shuttle.

13. (original) A space launched de-orbit instrument package as claimed in claim 1 wherein the payload of the instrument package is less than 40 kg.

14. (original) A space launched de-orbit instrument package as claimed in claim 3 wherein the attitude control system includes devices chosen from the group consisting

of reaction wheels, control moment gyros, magnetorquers and a combination thereof.

15. (original) A space launched de-orbit instrument package as claimed in claim 5 further including a target alignment device.

16. (original) A space launched de-orbit instrument package as claimed in claim 8 wherein the launch mechanism is robotically activatable.

17. (original) A space launched de-orbit instrument package as claimed in claim 16 wherein the launch mechanism includes at least one spring, at least one tie-down bolt and a corresponding tie-down nut.

18. (original) A space launched de-orbit instrument package as claimed in claim 8 further including a Special Purpose Dexterous Manipulator micro interface forming part of the tie down mechanism.

19. (currently amended) A space launched de-orbit instrument package for carrying on board observation instruments adapted to be launched from a space orbiting platform having a robotic interface comprising:

a housing including a protective skin and adapted to be launched from space into a de-orbit pattern, the housing having a base plate and outer walls and in which the base plate has stiffness and thermal inertial properties that are greater than those of the outer walls;

a tie down mechanism adapted to releasably attach the housing to the space orbiting platform;

a robotic interface adapted to be releasably connected to the robotic interface of the space orbiting platform;

a launch mechanism attachable to the outside of the housing;

a power supply secured in the inside of the housing;

a communication system operably connected to the power supply for

transmitting data to a location remote from the instrument package; and

an internal instrument volume inside the housing adapted to receive at least one scientific instrument connectable to the communication system and the at least one scientific instrument is adapted to be attached to the base plate.

20. (currently amended) A space launched de-orbit instrument package as claimed in claim 19 ~~further including a tie down mechanism where in~~ wherein the tie down mechanism includes a centre beam which extends from the base plate to an opposed side of the housing.

21. (original) A space launched de-orbit instrument package as claimed in claim 20 further including an on board control system operably connected to the power supply and connected to the base plate.

22. (original) A space launched de-orbit instrument package as claimed in claim 21 further including an attitude control system operably connected to the on board control system and connected to the base plate.

23. (original) A space launched de-orbit instrument package as claimed in claim 22 further including a global positioning system connected to the communication system and connected to the base plate.

24. (original) A space launched de-orbit instrument package as claimed in claim 23 wherein the on board control system is a computer.

25. (original) A space launched de-orbit instrument package as claimed in claim 24 further including solar arrays mounted on the outside of the housing.

26. (original) A space launched de-orbit instrument package as claimed in claim 24 further including a parachute mounted in the housing and deployable outside the

housing.

27. (currently amended) A space launched de-orbit instrument package as claimed in claim 24 ~~further including a launch mechanism attachable to the outside of the housing and~~ wherein the launch mechanism forms part of the tie down mechanism.

28. (original) A space launched de-orbit instrument package as claimed in claim 24 wherein the payload of the instrument package is less than 40 kg.

29. (original) A space launched de-orbit instrument package as claimed in claim 24 wherein the housing has a viewing window formed therein and the internal instrument volume is proximate thereto whereby the instrument positioned in the instrument volume looks out the window.

30. (original) A space launched de-orbit instrument package as claimed in claim 19 wherein the instrument package is adapted to be launched from the International Space Station.

31. (original) A space launched de-orbit instrument package as claimed in claim 19 wherein the instrument package is adapted to be launched from the space shuttle.

32. (original) A space launched de-orbit instrument package as claimed in claim 19 wherein the payload of the instrument package is less than 40 kg.

33. (original) A space launched de-orbit instrument package as claimed in claim 22 wherein the attitude control system includes devices chosen from the group consisting of reaction wheels, control moment gyros, magnetorquers and a combination thereof.

34. (original) A space launched de-orbit instrument package as claimed in claim 24 further including a target alignment device.

35. (original) A space launched de-orbit instrument package as claimed in claim 27 wherein the launch mechanism is robotically activatable.

36. (original) A space launched de-orbit instrument package as claimed in claim 35 wherein the launch mechanism includes at least one spring, at least one tie-down bolt and a corresponding tie-down nut.

37. (original) A space launched de-orbit instrument package as claimed in claim 27 further including a Special Purpose Dexterous Manipulator micro interface forming part of the tie down mechanism.

38. (currently amended) A process for launching a deorbiting instrument package from a space orbiting platform, the package having a chute, a communication system, and instruments including control instruments and at least one scientific instrument, the at least one scientific instrument being operably connected to the communication system and comprising the steps of:

robotically releasing the instrument package from the space orbiting platform;

deploying the chute when the instrument package is at a predetermined distance from the space orbiting platform thereby slowing down and stabilizing the instrument package; ~~and~~

orbiting the earth and collecting data by the instruments and transmitting it to a communication receiver; and

destroying the instrument package above a predetermined distance from the earth.

39. (original) A process for launching a deorbiting instrument package as claimed in claim 38 wherein the platform is the International Space Station.

40. (original) A process for launching a deorbiting instrument package as claimed in claim 38 wherein the platform is the space shuttle.

41. deleted

42. (original) A process for launching a deorbiting instrument package as claimed in claim 39 wherein the communication receiver is in the International Space Station.

43. (original) A process for launching a deorbiting instrument package as claimed in claim 38 wherein the communication receiver is on the earth.

44. (original) A process for launching a deorbiting instrument package as claimed in claim 38 further including the step of conducting a check of the instruments prior to launching the instrument package.

45. (currently amended) A process for launching a deorbiting instrument package as claimed 44 further including the step of opening the instrument package and repairing ~~the non~~ any responsive instrument.